

### **REMARKS**

Claims 1-14 and 21-26 are currently pending in the application. By this amendment, claims 1 and 8 are amended and claims 21-26 are added for the Examiner's consideration. Claims 15-20 are canceled without prejudice or disclaimer as being directed to a non-elected invention. The above amendments do not add new matter to the application and are fully supported by the original disclosure. For example, support for the amendments is provided in the claims as originally filed, at Figures 1 and 2, and at paragraphs 0002, 0003, 0015, and 0016 of Applicants' published application (i.e., U.S. Pub No. 2006/0073394). Reconsideration of the rejected claims in view of the above amendments and the following remarks is respectfully requested.

#### ***Telephone Interview***

Applicants thank the Examiner for the courtesy extended during a telephone interview between Examiner Dahimene and Applicants' representative on April 23, 2008. In the Interview, proposed amendments to the claims were discussed. Agreement with respect to allowable claim language was not reached.

#### ***Amendments to the Claims***

Applicants have amended claims 1 and 8 and cancelled claims 15-20 from further consideration in this application. Applicants are not conceding in this application that those claims are not patentable over the art cited by the Examiner, as the present claim amendments and cancellations are only for facilitating expeditious prosecution of the allowable subject matter noted by the examiner. Applicants respectfully reserve the right to pursue these and other claims in one or more continuations and/or divisional patent applications.

**35 U.S.C. §103 Rejection**

Claims 1-8 and 11-14 are rejected under 35 U.S.C. §103(a) for being unpatentable over U.S. Pat. No. 4,538,748 issued to Gruner et al. (“Gruner”). Claims 9 and 10 are rejected under 35 U.S.C. §103(a) for being unpatentable over Gruner in view of U.S. Pub. No. 2005/0106837 issued to Nakai et al. (“Nakai”). These rejections are respectfully traversed.

*Claims 1-8 and 11-14*

The invention relates to semiconductor fabrication, and more particularly to fabricating a combination of small and large structures. More specifically, independent claim 1 recites, inter alia, *forming a sidewall image transfer (SIT) loop on a substrate such that the SIT loop forms a hard mask*. Also, independent claim 8 recites, inter alia, *forming a sidewall image transfer (SIT) loop on a substrate such that the SIT loop forms a hard mask*. Applicants submit that Gruner does not disclose or suggest at least these features.

More specifically, as discussed in the telephone interview referred to above, Applicants submit that Gruner does not disclose sidewall image transfer (SIT) techniques, such that Gruner cannot arguably be said to disclose forming a sidewall image transfer (SIT) loop on a substrate. Instead, Gruner describes using photolithographic imaging techniques to create what the Examiner equates to the recited hard mask. Particularly, the Examiner contends that Gruner discloses a hard mask at element 90, and Applicants note that Gruner describes element 90 as a photosensitive resist mask (col. 4, line 6). Thus, Gruner discloses forming mask 90 using conventional photolithographic imaging techniques.

However, as discussed in the telephone interview, sidewall image transfer (SIT) techniques are recognized in the art as being different from conventional photolithographic imaging techniques, such as those utilized by Gruner. Technical information regarding sidewall

image transfer (SIT) techniques is provided in the documents cited in the Information Disclosure Statement filed on March 31, 2005, and indicated as considered by the Examiner in the outstanding Office Action. With particular regard to the difference between sidewall image transfer (SIT) techniques and conventional photolithographic imaging techniques, the Background of Applicants' specification states:

As the size of semiconductor devices has decreased, photolithographic techniques become unable to reliably create structures of the dimensions required. As photolithographic techniques have become unusable, other technologies have been developed to create the small structures required by the ever shrinking semiconductor devices. One example of a non-photolithographic imaging technique is sidewall image transfer ("SIT").

SIT is able to produce structures substantially narrower than the minimum size achievable with photolithographic techniques, while maintaining excellent width control.

(Applicants' specification, page 1).

Moreover, as described in U.S. Pub. No. 2006/0084243:

[0004] Alternatives to the photolithographic process in patterning have already been explored in the art. One such method is the spacer image transfer (SIT) method which has a relatively long history, commencing with the publication: C. Johnson et al., "Method of Making Submicron Dimensions in Structures Using Sidewall Image Transfer Techniques", IBM Technical Disclosure Bulletin, vol. 26, No. 9, February 1984, pp. 4587-4589. The SIT method uses sidewall deposition and etching properties for creating thin lines.

Also, as described in U.S. Pat. No. 6,875,703:

Sidewall Image Transfer (SIT) techniques form conductors with very narrow widths or semiconductor devices with very short gate lengths without using critical photolithography. Sidewall Image Transfer has been proposed as a way to produce well-controlled images having sub-lithographic dimensions.

(column 2, lines 3-9).

Based on these descriptions, Applicants respectfully submit that sidewall image transfer (SIT) techniques are recognized in the art as being different from photolithographic imaging

techniques. As Gruner discloses the use of conventional photolithographic imaging techniques, Gruner cannot reasonably be said to disclose or suggest *forming a sidewall image transfer (SIT) loop on a substrate such that the SIT loop forms a hard mask*, as recited in independent claims 1 and 8.

Moreover, Gruner does not disclose forming a loop. Instead, Gruner only shows side views of the structure (e.g., FIGS. 1-2), and does not show or describe a loop that forms a hard mask, as recited in claims 1 and 8.

Claims 2-7 and 11-14 depend from independent claims 1 and 8, respectively, and are distinguishable from the applied art at least for the reasons discussed above with respect to the independent claims. Moreover, the applied fails to disclose or suggest many of the additional features recited in these dependent claims.

Accordingly, Applicants respectfully request that the §103 rejection of claims 1-8 and 11-14 be withdrawn.

Claims 9 and 10

Claims 9 and 10 are rejected under 35 U.S.C. §103(a) for being unpatentable over Gruner in view of Nakai. This rejection is respectfully traversed. Claims 9 and 10 depend from independent claim 8 and are distinguishable from the applied art at least for the reasons discussed above with respect to the independent claim. Nakai does not cure the deficiencies of Gruner with respect to independent claim 8. That is, Nakai does not disclose or suggest *forming a sidewall image transfer (SIT) loop on a substrate such that the SIT loop forms a hard mask*. Therefore, the applied art fails to disclose or suggest all of the features of independent claim 8, from which claims 9 and 10 depend.

Accordingly, Applicants respectfully request that the §103 rejection of claims 9 and 10 be withdrawn.

***New Claims***

New claims 21-25 are added by this amendment. New claims 21-24 recite, inter alia, *forming a sidewall image transfer (SIT) hard mask loop on a substrate, wherein a narrow section of a target shape coincides with a portion of the hard mask loop and a wide section of the target shape overlaps the hard mask loop*. As discussed above with respect to claims 1 and 8, Applicants submit that the applied art fails to disclose or suggest sidewall image transfer (SIT) techniques.

Moreover, Gruner fails to disclose or suggest forming a hard mask *loop*. Even further, as Gruner fails to disclose a loop, it follows that Gruner does not disclose or suggest forming a loop where respective sections of a target shape coincide with or overlap the loop. Therefore, Gruner fails to disclose or suggest all of the features of new independent claim 21, and claims 22-24 that depend therefrom.

New claims 25 and 26 depend from independent claim 1 and are distinguishable from the applied art based upon their dependency from the independent claim. Moreover, the applied art does not disclose or suggest many of the additional features recited in these claims.

**CONCLUSION**

In view of the foregoing amendments and remarks, Applicants submit that all of the claims are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue. The Examiner is invited to contact the undersigned at the telephone number listed below, if needed. Applicants hereby make a written conditional petition for extension of time, if required. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 09-0456.

Respectfully submitted,  
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A handwritten signature in dark ink, appearing to read 'Andrew M. Calderon', is written over a horizontal line.

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